REMARKS

Applicant thanks the Examiner for allowing claims 5-14, 22-28, and 30-36.

The Examiner has required restriction to one of the following inventions under 35 U.S.C. § 121 and 372:

I. Claims 1-4 and 15-21, stated by the Examiner as being drawn to a glass sheet; or

II. Claims 5-14 and 22-36, stated by the Examiner as being drawn to the method and apparatus of making.

In response to the restriction requirement, Applicants, through their attorney, provisionally elect the invention of Group II (claims 5-14 and 22-36) with traverse. Applicants traverse the restriction requirement on the grounds that no serious burden on the Examiner exists. If the search and examination of an entire application can be made without serious burden, it must be examined on the merits even though it includes claims directed to distinct or independent invention. M.P.E.P § 803. The subject matter of Groups I -II are believed sufficiently related that a thorough search for the subject matter of either group would encompass a search for the subject matter of both groups. To avoid duplicative examination by the Patent Office and unnecessary delay and expense to Applicants, Applicants respectfully request examination on the merits of all the claims, not just those of Group II.

Furthermore, Applicants submit that if a determination of an allowable generic claim is issued, claims that are written in dependant form or otherwise include all the limitations of the allowed generic claim should be considered. M.P.E.P. § 809.02(c). Therefore, Applicants respectfully request that the Examiner consider rejoining the claims of Group I upon a finding of allowability of the claims of Group II.

The Examiner objected to the drawings as failing to comply with 37 CFR 1.84(p)(5) because they did not include reference signs A and B mentioned in the description. The

Examiner also objected to the drawings as failing to comply with 37 CFR 1.84(p)(5) because they included reference sign 104 and reference sign 310 not mentioned in the description. Applicant hereby submits amended Figures 2, 3, 7 and 10. Figures 2 and 3 have been amended to delete reference sign 104. Figures 7 and 10 have been amended to include reference signs A and B. Application has also amended the specification on page 18, line 19 to provide support for reference sign 310 in Figure 5 without adding new matter.

The Examiner objected to the abstract because the abstract is greater than 150 words long. The abstract has been replaced with a new abstract that is less than 150 words long.

The Examiner objected to the specification because of certain informalities. The specification has been amended to correct informalities on page 8, line 18, on page 11, line 16, on page 21, line 10 and on page 28, line 2. The Examiner stated that the term "lehr" on page 22, line 20 is not understood. Applicant asserts that the term "lehr" is used in connection with the term "annealing lehr" and the term "annealing lehr" is well known in the art as "an oven used to anneal glass". Applicant believes the term "lehr" as used in this context to be understood.

The Examiner has rejected claim 29 under 35 U.S.C. 112, first paragraph as failing to comply with the written description requirement because the limitation "about 150Å" is new matter. Applicant asserts that the limitation "about 150Å" is not new matter. Support for the limitation "about 150Å" can be found, for example, on page 10, lines 1-3. Applicant respectfully requests the Examiner's rejection of claim 29 be withdrawn.

Finally, the Applicant would like to thank Examiner VerSteeg for extending the courtesy of an interview on June 10, 2004 to discuss the above identified application and the pending claims in view of two recently discovered documents. The Applicant acknowledges the content of the interview summary (Form PTOL-413) prepared by the Examiner, dated June 10, 2004.

Furthermore, the following remarks include issues addressed by the Applicant in the interview and may be considered as a record of the substance of the interview, supplementing the interview summary prepared by the Examiner.

The Applicant has provided two additional documents to the Examiner for consideration in the examination of the above mentioned application. The first document is entitled "Prospekt uber das Hochrate-Zerstaubungssystem zur Zweiseitenbeschichtung "HZS-04" des VEB ELEKTROMAT DRESDEN, Erscheinungsjah 1986 (Druck-Nr. 05/005/86)" (hereinafter the "Mikroelektronik document"). The second document is a "Quotation Specification" dated August 17, 1988, (hereinafter the "second document"), and has been submitted for the Examiner's consideration under seal and with a Petition to Expunge due to its confidential nature. It is respectfully submitted that the second document discloses subject matter that is not "material" because it is merely duplicative of the Mikroelektronik document. The second document does not add any additional relevant teachings which would provide assistance with the examination of the present application. Therefore, consideration of the second document and subsequent expungement from the file history is appropriate in view of the second document's duplicative teachings.

It is also noted that adequate evidence has not been found at this time to corroborate that the Mikroelektronik document or the second document qualify as prior art (e.g., no information has been provided as to the publication or dissemination of the Mikroelektronik document, the second document or the contents of either). Regardless, to expedite examination and prosecution of the present application, the identified independent claims, as shown above, have been amended to further clarify the invention of the present application. However, the Applicant reserves the right to pursue the scope of the subject matter submitted in the originally filed

claims in future divisional, continuation or continuation in part applications. Therefore, the Applicant considers that the patent should be maintained even if the Mikroelektronik document and/or second document qualify as prior art. Since the two references disclose Vacuum Coating Systems that have similar components and utilize similar carrier systems, such as pallet transport systems, only the Mikroelektronik document is discussed below and arguments submitted may also be applied in view of the second document.

The Mikroelektronik document teaches a coater that is adapted primarily for applying coatings onto small-area substrates in the manufacture of microelectronics. This coater is based on a carrier transport system, such as a pallet transport system. The pallet transport system is described in detail throughout the Mikroelektronik document (see pages 5, 9, 10, 11, 14, and 15). In such a system, the substrate is mounted on or within a pallet to which the outer periphery of the substrate is secured. Typically, the margins of the substrate's bottom surface rest on the pallet. Other surfaces (e.g., the top surface and/or edge surfaces) of the substrate may also be secured against the pallet. Once the substrate has been mounted on the pallet, the pallet is secured on a transport system and travels through the coater along with the substrate. In the Mikroelektronik system, the pallet is driven through the chamber by frictional steel wheels.

The claims identified above include a substrate support that allows the entire interior and exterior surfaces of the glass to be coated, such as a plurality of rollers, which substantially extend across the width of the vacuum chamber to support the glass itself. Such a substrate support avoids a number of limitations and drawbacks found in carrier systems, such as the Mikroelektronik pallet transport system. For example, it is not possible to achieve full area coating of the substrate's bottom surface using the Mikroelektronik pallet transport system. This is because part of the substrate's bottom surface must rest directly on the palette. This causes

some of the substrate's bottom surface to be shadowed and prevented from being coated. This is unacceptable for many large-area substrates, such as glass sheets for architectural applications where the whole of the substrate's bottom surface is to be coated.

Furthermore, pallet transport systems would not be expected to stably support architectural glass or other comparable large-area substrates. The manner in which a pallet supports only the margins of each substrate would be expected to result in unacceptable sagging or "bowing" of the substrate when large, heavy substrates are used. For example, the bowing of large glass sheets would be expected to result in the glass falling from the palette and breaking. Even if such a substrate were prevented from falling out of the palette, the tunnels between adjacent sputtering chambers would be too narrow to allow the bowed substrate to pass from one chamber to the next. The tunnels could be redesigned to provide more clearance, but this would interfere with the dynamic gas separation that is achieved by passing a flat substrate through a narrow tunnel, which allows the substrate itself to restrain gas flow through the tunnel. Moreover, unacceptable coating uniformity would result in any scenario where coatings are sputtered onto a bowed substrate, due to the differing angles of incidence at which sputtered particles would strike different areas of the substrate. Thus, the Applicant considers that the palette transport system taught in the Mikroelektronik document would not be feasible for coating glass sheets for architectural applications or other comparable large-area substrates.

Further, in a pallet transport system, each palette is configured for a single substrate size and shape. For manufacturers to coat substrates of different sizes or shapes, it is necessary to maintain a large stockpile of palettes in different sizes and shapes. Palette transport systems also impose undesirable limits on the load sizes and throughput that can be achieved with a coater. For example, conveying substrates in a side-by-side fashion would not be convenient using a

palette transport system. Insert-type hardware could be used to accomplish such loading, but this would require additional time, labor, and hardware. Moreover, the inserts would require additional cleaning and maintenance, and they likely would create additional traps for gas, water, and other contaminants.

Palette transport systems also account for a significant amount of coating loss, in that some of the material being sputtered is deposited on the palettes, rather than on the substrates. The build-up of coating material on the palettes then typically must be removed by periodic cleaning, which becomes quite burdensome in production environments where a large number of palettes are used.

Further, because palettes are repeatedly transferred between the ambient environment and the carefully controlled vacuum inside the coater, palettes present a number of other problems. For example, when palettes are in the ambient environment, they can absorb gas, water, and other contaminants. Then, when the palettes are moved inside the coater, these absorbed materials can outgas or otherwise be released into the controlled vacuum inside the coater. As a result, palettes must be preconditioned before being sent through the coater, so as to remove from the palettes as much gas, water, and other contaminants as possible. Even with preconditioning, palettes tend to outgas to some extent once inside the coater. This outgassing can impact process stability, coating uniformity, and coating quality. For example, significant changes in sputtering rate can be caused by very small amounts of water vapor in a sputtering chamber. Moreover, the amount of absorbed gas that outgases from palettes tends to quite variable. Therefore, it is difficult to predict the amount of outgassing that will occur, and it is likewise difficult to compensate for such variable outgassing. Further, the palettes when first conveyed into the coater tend to be at room temperature, while process temperatures inside the

coater tend to be much higher. Thus, the temperature of the palettes going through the coater can also impact the sputtering process, thereby affecting the thickness and quality of the film deposited, which in turn impacts the properties of the resulting coatings. As a result, additional preconditioning may be required to bring the palettes to a desired preprocessing temperature. In addition, as the temperature of a pallet changes during these heating and cooling cycles, coating material on the palette tends to expand and contract, potentially causing flakes to spall from the coating material on the palette. Spalling flakes can litter the inside of the coater, and the quality of the sputtering process can be impacted when such flakes land upon targets below the path along which the palettes travel. It can thus be appreciated that the palette transport system has a number of disadvantages in terms of process stability, coating uniformity, and coating quality.

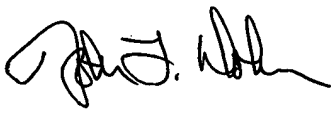
Still further, palette transport systems commonly require complicated equipment for shuttling palettes from the end of the coater back to the front of the coater. For example, the Mikrolektronik system teaches complex pallet magazines that must be used at both the front and the back of the coater. Each magazine holds a limited number of palettes. The magazines must be loaded at the beginning of an operation, and unloaded at the end of the operation. After the palettes are unloaded, they must be returned to the front of the coater. Thus, palette systems also require a palette return system. For example, the palette return system may involve a conveyor line adapted for transporting empty palettes from an unloading area adjacent the end of the coater to a loading area adjacent the front of the coater. A clean room type environment is commonly maintained around the palette return line, so as to isolate the palettes from the surrounding environment. The empty palettes also must be cleaned periodically. Thus, the palette return system typically includes a palette cleaning section, where each palette is washed or sandblasted after a certain number of passes through the coater. This cleaning typically introduces additional

water and/or other contaminants, such as detergent, sand or other coating remnants, which must then be removed as thoroughly as possible before the palettes are sent back through the coater. Thus, the added complexities of the palette transport system can be acutely appreciated.

In view of the foregoing, it is submitted that all claims of application are in condition for allowance. Favorable consideration and prompt allowance of the application are respectfully requested.

The Examiner is invited to telephone the undersigned if the Examiner believes it would be useful to advance prosecution.

Respectfully submitted,



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